



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

June 02, 2017

PC Code: 128994
DP Barcode: 431636

MEMORANDUM

SUBJECT: **Dithiopyr:** Transmittal Memo of Environmental Fate DERs for Laboratory Volatility Study

FROM: Faruque Khan, Senior Scientist
Environmental Risk Branch I
Environmental Fate and Effects Division (7507P)

THRU: Sujatha Sankula Ph. D., Branch Chief
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Date: 2017.06.02
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TO: Veronica Dutch, Chemical Review Manager
Linda Arrington, Branch Chief
Risk Management and Implementation Branch V
Pesticide Re-Evaluation Division (7508P)

The Environmental Fate and Effects Division (EFED) has reviewed the laboratory volatility of dithiopyr study (MRID 49760101) submitted by Dow AgroSciences in support of registration review. The test system consisted of a single sample for which volatiles were monitored through 21 days but soil was analyzed only at study termination, so that a material balance was provided only at the final sampling interval. The test substance was technical grade rather than a typical end use product. This study is classified as **supplemental**.

Additional information is not needed for OCSPP Guidelines 835.1410. Study classification is summarized in **Table 1** below:

Table 1. Summary of difenoconazole environmental fate studies

MRID	OCSPP Guideline	Study Classification	Comments
49760101	835.1410	Supplemental	This study can be used for qualitative characterization of dithiopyr volatilization from soil

Laboratory volatility of dithiopyr

Report: MRID 49760101. Dobson, R. 2015. [¹⁴C]-Dithiopyr: Volatility from Soil. Unpublished study performed by Battelle UK Ltd., Essex, UK; sponsored and submitted by Dow AgroSciences, Indianapolis, Indiana. Battelle Report No.: YR/14/014. DAS Study ID: 141203. Experiment initiation November 20, 2014 and completion June 15, 2015; final report issued July 27, 2015 (pp. 1, 6).


Document No.: MRID 49760101


Guideline: 835.1410

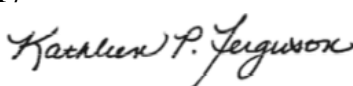
Statements: The study was conducted in accordance with OECD and UK Good Laboratory Practice Standards (p. 3). Signed and dated Data Confidentiality, GLP, and Quality Assurance statements were provided (pp. 2-4); a statement on the authenticity of the report was provided with the QA statement.

Classification: This study is scientifically valid and provides useful information on the volatilization of dithiopyr. The test system consisted of a single sample for which volatiles were monitored through 21 days but soil was analysed only at study termination, so that a material balance was provided only at the final sampling interval. The test substance was technical grade rather than a typical end use product. This study is classified as **supplemental** and can be used in qualitative characterization of dithiopyr volatilization from soil.

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Final EPA Reviewer: Faruque Khan
Senior Fate Scientist
Signature: 
Date: 06-02-2017

CDM/CSS-Dynamac JV Reviewers: Dan Hunt, M.S.
Environmental Scientist
Signature: 
Date: 3/7/17

Kathleen Ferguson, Ph.D.,
Environmental Scientist
Signature: 
Date: 3/7/17

This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel.

Executive Summary

In a laboratory study, the volatility of [pyridine-4-¹⁴C]dithiopyr was investigated on a sand soil (pH 5.2, 0.57% organic carbon) maintained under aerobic conditions at $20 \pm 2^\circ\text{C}$ and a soil moisture content of 54.6-60.0% of the maximum water holding capacity for 21 days. The soil used was selected to provide a worst-case situation for volatilization. A single sample was prepared, treated on 1/12/14 at 14:10 hours at *ca.* 2.0 mg a.i./kg (equivalent to a single field application of 0.56 kg a.i./ha), and attached to a continuous flow-through (flow rate 1.1 m/second or 2.5 miles/hour) volatile trapping apparatus. Volatilized [¹⁴C]residues were trapped using polyurethane foam plugs, which were collected and replaced at 1, 2, 3, 4, 7, 9, 11, 15, 17, and 21 days posttreatment. The foam plug extracts were analysed using LSC and HPLC. At the termination of the 21-day study period, the soil was extracted and analyzed by LSC and HPLC. Extracted soil was analysed using LSC following combustion.

Dithiopyr dissipated rapidly during the first 24 hours of the experiment, with the volatilization rate decreasing by more than half between 1 and 2 days and again between 2 and 3 days. Average dithiopyr air concentrations were $20.61 \mu\text{g}/\text{m}^3$ for the first 24 hours posttreatment, $9.47 \mu\text{g}/\text{m}^3$ for the second 24 hours, and $5.11 \mu\text{g}/\text{m}^3$ for the third 24 hours. During the final 4 days of the experiment, time-averaged air concentrations were $0.47 \mu\text{g}/\text{m}^3$. Based on the total volume of air passing through the system, the time-averaged air concentration was $2.61 \mu\text{g}/\text{m}^3$ over the 21-day experiment. At study termination, a total of 73.53% of the applied radioactivity had volatilized from the treated soil; dithiopyr was the only volatilized compound. Also at 21 days, 15.26% of the applied was extracted from the soil, 0.24% was unextracted, and 2.46% was rinsed from the lower chamber. Radioactivity in the soil was predominantly dithiopyr (97.9% of the recovered radioactivity; 14.49% of the applied), with one additional single component peak (unidentified) accounting for 0.31% of the applied radioactivity. The overall mass balance at 21 days was 91.50% of the applied.

The duration of the experiment was adequate to see the decline in air concentrations of the parent and transformation products.

I. Material and Methods

A. Materials

- 1. Test Material** The test material was prepared by diluting a stock solution of [¹⁴C]-dithiopyr in acetone with further acetone (pp. 17-18; Figure 1, p. 30).

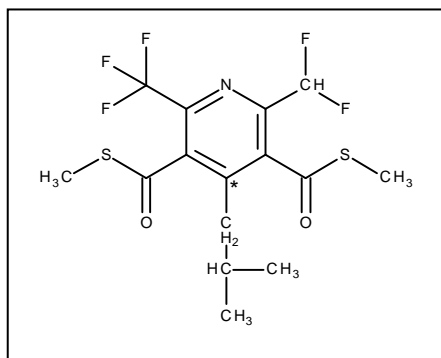
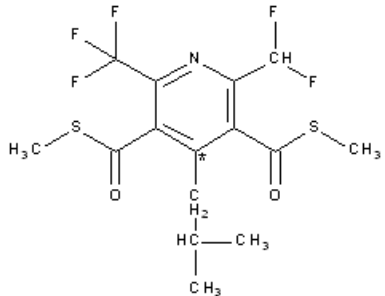


Table 1. Properties of Test Material

Property	Value
Product Name	[Pyridine-4- ¹⁴ C]-Dithiopyr
Formulation Type	N/A
Typical end-use product?	No
Contaminants and/or impurities	Not reported
Manufacture #	Not reported
Lot #	DE3-124733-47
Type of radiolabel	Pyridine ring
Specific radioactivity	2.66 MBq/mg
Radiochemical purity	99.06%
CAS #	97886-45-8
Chemical structure	
Storage stability	Not reported
pH	Not reported

Data obtained from pp. 16, 23; and Figures 1-2, pp. 30-31 of the study report.

N/A = not applicable.

2. Storage Conditions

The storage conditions of the test substance were not reported.

3. Soil

German LUFA 2.1 soil was used for the soil experiment (p. 16; Table 1, p. 26). The soil was not sterilized prior to use, to mimic as far as possible the conditions found in the field.

Table 2. Soil(s) Collection, Storage and Properties

Property	Value
Geographic location	Dudenhofen, Rheinland Pfalz, Germany
Pesticide use history at the collection site	None for several years
Collection date	November 4, 2014
Collection procedures	Not reported
Sampling depth	ca. 20 cm
Storage conditions	Ambient
Storage duration	Not reported
Soil preparation	Soil was air-dried and sieved (2 mm)
Soil texture (USDA):	Sand
% Sand	90
% Silt	6
% Clay	4
pH (1:1 soil:water)	5.2

Property	Value
Organic carbon (%)	0.57
Organic matter (%) (Walkley Black method)	0.99
CEC (meq/100 g)	3.7
Soil Moisture Content (%):	
At 0.1 bar (pF 2.0)	6.4
At 1/3 bar (pF 2.5)	5.5
Bulk density (g/cm ³) - disturbed	1.44
Microbial biomass:	
At initiation	Not measured
At termination	Not measured
Soil taxonomic classification (WRB)	Not reported

Data obtained from pp. 16, 23; Table 1, p. 26; and Appendices 4-5, pp. 50-51, of the study report.

B. Study Design

1. Experimental Conditions

The volatility apparatus is illustrated in Figure 4 (p. 33) from the MRID. The apparatus was constructed in two parts, a base with a groove that allowed a soil layer 2 cm deep, 2 cm wide and 25 cm long, and an upper chamber with a corresponding groove so that when the two chamber were connected there was an air channel above the soil through which air was passed over the soil surface (p. 17; Figure 4, p. 33). Air flow through the chamber (1.1 m/second or 2.4 L/minute, equivalent to *ca.* 2.5 miles/hour) was driven using a vacuum pump and controlled by a regulator. Air was passed through a humidifying chamber containing saturated calcium chloride solution, prior to passing over the soil. A probe was inserted to monitor the temperature and humidity of the air stream, and moisture was continually added to the soil at a controlled rate. Volatile traps consisted of two PU-foam traps and a wash bottle filled with Dowex optipore resin beads. The volatility chamber was kept in a temperature-controlled room maintained at 20°C.

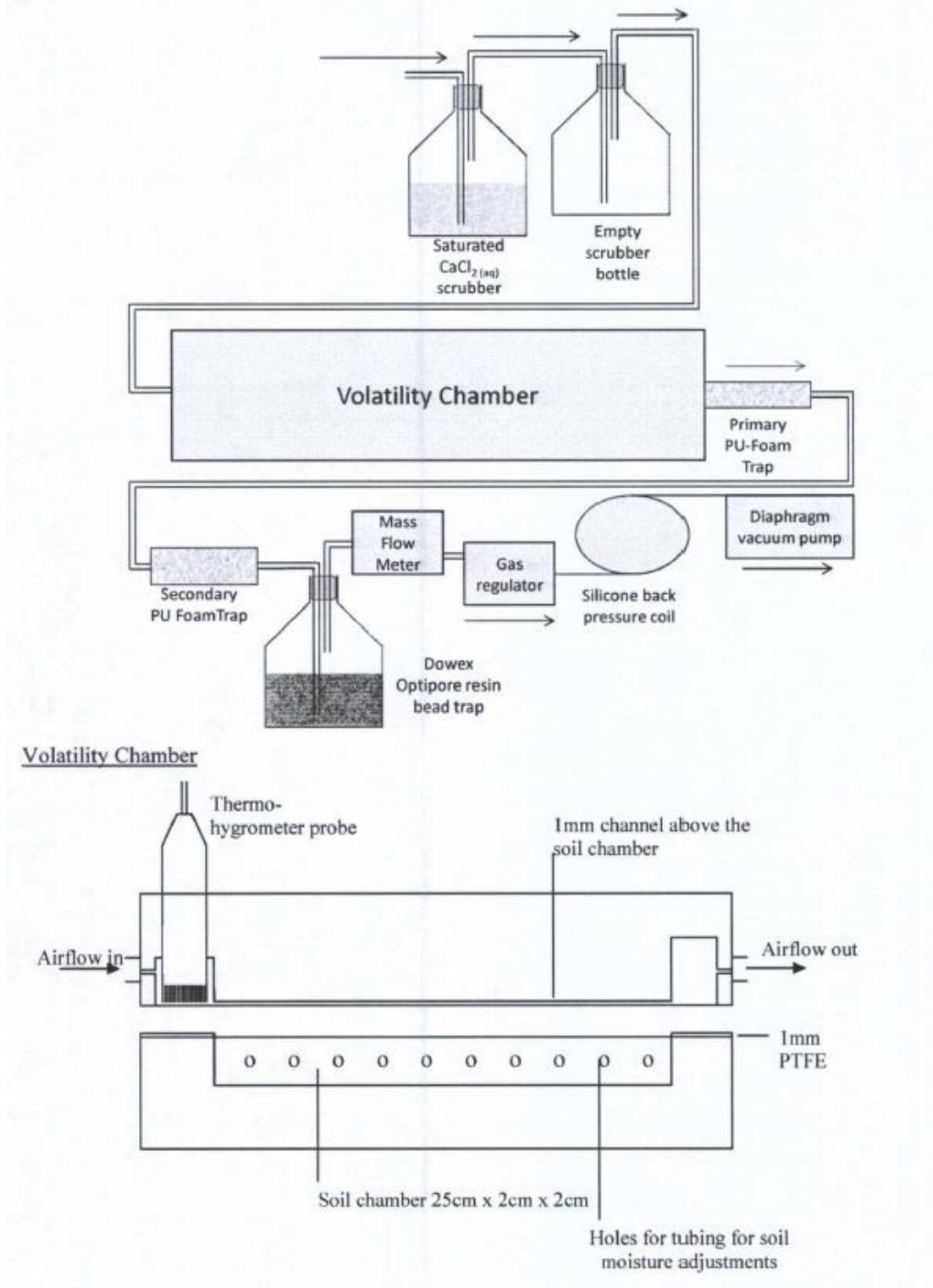
Figure 4: Diagram of Experimental ApparatusSystem Set-up

Table 3. Experimental Design

Parameter		Description
Duration of the test (days)		21
Soil condition (Air dried/fresh)		Sieved (2 mm)
Soil sample weight (g/replicate)		139.6
Soil depth (cm)		2 cm
Test concentration (mg ai/kg soil (dry weight))		2.00 ¹
Field Equivalent Application Rate (lb a.i./A)		0.5 (0.56 kg/ha)
Number of replicates		One sample was prepared, and volatiles from this sample were trapped throughout the study.
Test apparatus		The test apparatus is illustrated in Figure 4. Air was continually drawn through the chamber (1.1 m/second or 2.4 L/minute), then through two polyurethane foam plugs and resin beads.
Test material application	Test solution volume used/ treatment	0.92 mL plus 1 mL water rinse
	Application method	Treated dropwise using a glass Pasteur pipette
Indication of test material adsorbing to walls of test apparatus?		Yes, 3.59% of the applied radioactivity was recovered from the surfaces of the chamber top.
Experimental conditions	Temperature (°C)	20 ± 2°C
	Relative humidity	30 ± 1%
	Soil moisture content	60% MWHC
	Moisture maintenance method	Water was added to the soil through a peristaltic pump during the monitoring period.
	Air flow through system	2.6 ± 0.1 L/minute
	Continuous darkness (Yes/No):	Conducted in a volatility chamber
Other observations (if applicable)		None

Data obtained from pp. 17-18, 23-24, Table 2, p. 27; and Table 5 (see **Attachment 2**), p. 29, of the study report.

¹ Reviewer-calculated (see **Attachment 2**) from a test substance weight of 0.28 mg (p. 15) and a soil weight of 139.6 g (Table 2, p. 27).

2. Sampling during Study Period

Volatilized [¹⁴C]residues were trapped in using two polyurethane foam plug (p. 18). The plug directly adjacent to the volatilization chamber was collected and replaced at 1, 2, 3, 4, 7, 9, 11, 15, 17 and 21 days following the test application. The second foam plug was collected at study termination. Also at study termination, the soil was extracted, and the soil extracts and extracted soil were analyzed using LSC. Each half of the volatility chamber was washed in a methanol bath and analyzed by LSC to determine total radioactivity on the surfaces of the unit (p. 19).

Table 4. Sampling Design

Parameter	Description
Air Sampling	
Sample intervals (days)	At 1, 2, 3, 4, 7, 9, 11, 15, 17, and 21 days
Sampling method	Polyurethane foam plugs
Desired air flow of sampler (L/min)	Set at 2.6 ± 0.1 , desired 2.4
Sample storage before analysis (Yes/No)?	None
Soil Sampling	
Sample intervals (units)	At 21 days
Sampling method	All soil in the chamber
Sample storage before analysis (Yes/No)?	Not reported

Data obtained from p. 18 and Table 3, p. 27, of the study report.

3. Sample Handling and Storage Stability

The soil was extracted immediately after collection (p. 19). The extracts were analyzed by LSC, HPLC and LC-MS on the day of sampling. It was not known if the polyurethane plugs and the volatilization chamber were stored before processing.

4. Analytical Procedures

Extraction methods: Polyurethane foam plugs were extracted three times by shaking for 20 minutes with 100 mL of acetonitrile (p. 19). Extracts were pooled for analysis. Resin beads in the third trap were not analyzed.

Soil samples were extracted three times with 300 mL of methanol by shaking in a HDPE bottle for 20 minutes per extraction (p. 19). After the first and second soil extraction, the extracts were centrifuged, and the supernatant was decanted and pooled. The third extract was kept separated, and a final extraction was performed by shaking for 20 minutes with water.

The top and bottom of the extraction chamber were extracted separately using a methanol bath containing *ca.* 1140-1260 g of methanol (p. 19). Extracts were performed immediately after the chamber was opened and the soil was removed. The PTFE tubing was extracted together with the top half of the unit.

Total Radioactivity Measurement: Total ^{14}C residues were determined by summing the percent of applied mass found in residues measured in the polyurethane foam plug traps, soil extracts, and on the surface of the top and bottom half of the volatilization chamber (p. 19). Radioactivity was measured by LSC (p. 20). Post-extracted soil samples were combusted and the evolved carbon dioxide was trapped and analyzed by LSC.

Identification and Quantification of Parent Compound: Aliquots of the soil extracts were analyzed for dithiopyr using HPLC (Phenomenex Gemini C18 NX column) using a mobile phase gradient of A) water containing 0.1% formic acid and B) acetonitrile containing 0.1% formic acid (p. 20). Identity of dithiopyr was confirmed in the combined soil extracts and the polyurethane foam plug extract by LC-MS, operated in the positive ion Electrospray Ionization mode (Appendix 6, pp. 52-53).

Detection Limits (LOD, LOQ) for the Parent Compound: For LSC analysis, the LOQ was

0.00004% of the applied radioactivity (18.28 dpm; p. 21). For HPLC analysis, the LOD was 0.35% of the applied radioactivity (31.50 cpm) and the LOQ was 0.69% of the applied radioactivity (63.00 cpm; p. 22).

Detection Limits (LOD, LOQ) for the Transformation Products: No transformation products were evaluated in the study.

Instrument performance: HPLC column recovery was 103.7%, with no significant radioactivity retained on the column after the normal run time (p. 23; Table 6, p. 29; Appendix 9, pp. 62-63).

Lab recovery, air sampling sorbent material: Not reported

Lab recovery, soils: Not reported

Breakthrough, air samples: N/A

II. Results and Discussion

A. Data

Percentage of the applied radioactivity detected in polyurethane foam plug traps, soil extracts, and on the surface of the top and bottom half of the volatilization are shown in **DER Table 5**. The extract of the top half of the volatility apparatus was considered to belong to the volatilized fraction as the test item crossed an air gap to reach the top half of the chamber. Airflow during the study is presented in **MRID Table 5**. The study author calculated a time-averaged air concentration immediately above the soil surface of $2.61 \mu\text{g}/\text{m}^3$, based on the total volume of air passing through the system (p. 24).

B. Material Balance

The material balance after 21 days is shown in **DER Table 5**. At study, overall recovery was 91.5% of the applied radioactivity (Table 4, p. 28).

C. Study Conditions

Soil moisture declined from 60.0% MWHC to 54.6% MWHC during the course of the 21-day study period (p. 23). Inflow air temperature ranged from 19.3 to 19.9°C. Microbial biomass in the test soil was not monitored during the study. Flow rate was constant (Figure 7, p. 35). Test system measurements are presented in **MRID Table 5**.

D. Transformation Products

Radioactivity in the soil was predominantly dithiopyr (97.9% of the recovered radioactivity; 14.49% of the applied), with one additional single component peak (unidentified) accounting for 0.31% of the applied radioactivity (p. 24; Figure 8, p. 36).

Polyurethane foam plug extracts contained only dithiopyr (p. 24; Figure 5, p. 34).

E. Volatilization

Dithiopyr dissipated rapidly during the first 24 hours of the experiment, with the volatilization rate decreasing by more than half between 1 and 2 days and again between 2 and 3 days (**DER Table 6**).

Table 5. Volatilization of [¹⁴C]Dithiopyr, expressed as a percentage of the applied, from soil.											
Sampling Interval (days)	1	2	3	4	7	9	11	15	17	21	Total
PUF traps	27.66	12.70	5.96	4.91	6.97	2.82	2.19	3.16	1.13	2.44	69.94
Chamber – Top half	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.59	3.59
Cumulative volatilized	27.66	40.36	46.32	51.23	58.20	61.02	63.21	66.37	67.50	73.53	73.53
Extracted residues	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15.26	15.26
Unextracted residues	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.24	0.24
Chamber – Bottom half	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.46	2.46
Total nonvolatilized	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.96	17.96
Mass balance	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	91.49

Data obtained from Table 4, p. 28, of the study report. Totals at study termination were reviewer-calculated.

n.a. = Not analyzed.

Table 5: Test System Measurements

Date and Time	Time (h)	Inflow Air Temp (celsius)	Inflow Relative Humidity (RH%)	Cumulative Total Flow (L)	Flow Rate (L/min)	Speed (m/s)
01/12/2014 14:10	0.0			0.0	n/a	n/a
01/12/2014 15:10	1.0	19.8	31.6	153.8	2.56	1.07
02/12/2014 14:10	24.0	19.5	32.1	3691.5	2.56	1.07
03/12/2014 14:01	47.8	19.9	31.6	7378.9	2.57	1.07
04/12/2014 10:51	68.7	19.6	31.9	10587.2	2.57	1.07
05/12/2014 14:30	96.3	19.6	31.6	14851.6	2.57	1.07
08/12/2014 13:45	167.6	19.6	31.6	25908.5	2.58	1.07
09/12/2014 15:15	193.1	19.4	32.0	29894.8	2.58	1.08
10/12/2014 13:30	215.3	19.8	31.4	33343.8	2.58	1.08
11/12/2014 11:30	237.3	19.5	31.9	*	*	*
12/12/2014 13:20	263.2	19.4	32.3	40681.4	2.58	1.07
15/12/2014 10:47	332.6	19.5	32.0	51410.9	2.58	1.07
16/12/2014 13:20	359.2	19.3	32.1	55526.3	2.58	1.07
17/12/2014 15:10	385.0	19.6	32.6	59516.1	2.58	1.07
18/12/2014 15:35	409.4	19.5	32.4	62975.5	2.56	1.07
22/12/2014 10:10	500.0	19.7	32.3	77349.5	2.58	1.07

Both flow rates and speeds are average values for the period ending at the date and time listed in the first cell of that row, hence no values are calculable for time zero.

n/a : Not applicable

* No flow rate data available for this timepoint due to recording error.

Table obtained from p. 29 in the study report.

Table 6. Average Dithiopyr air concentrations throughout the experiment (reviewer-calculated).

Sampling Interval (days)	1	2	3	4	7	9	11	15	17	21	Entire period
Volatilized at each interval (% of applied)	27.66	12.7	5.96	4.91	6.97	2.82	2.19	3.16	1.13	2.44	73.53
Volatilized at each interval (μg) ¹	76.065	34.925	16.39	13.5025	19.1675	7.755	6.0225	8.69	3.1075	6.71	202.2075
Cumulative volume of air (L)	3691.5	7378.9	10587.2	14851.6	25908.5	33343.8	40681.4	55526.3	62975.5	77349.5	77349.5
Volume of air per interval (L)	3691.5	3687.4	3208.3	4264.4	11056.9	7435.3	7337.6	14844.9	7449.2	14374	77349.5
Air concentration ($\mu\text{g}/\text{m}^3$)	20.61	9.47	5.11	3.17	1.73	1.04	0.82	0.59	0.42	0.47	2.61

Data obtained from Tables 4-5, pp. 44-45, in the study report.

¹ 275 μg of dithiopyr were applied to the soil

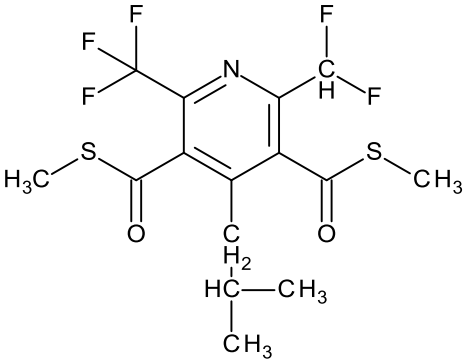
III. Study Deficiencies and Reviewer's Comments

1. A single sample was prepared, with the polyurethane foam plug sampled and replaced at each interval and the soil analyzed only at study termination. Duplicate systems should be sampled at each interval so that between-replicate variability can be assessed.
2. A material balance was provided only at the final sampling interval.
3. The experiment was not conducted with a typical end-use product. The volatilization study was conducted with [^{14}C]dithiopyr.
4. The soil (sand texture) used in this study was intended to represent a worst-case scenario for the rate of volatilization (p. 16).
5. The concentration of dithiopyr in air over time was not calculated by the study author. Only average concentrations over the 21-day sampling period were reported, which did not reflect the volatility profile of dithiopyr. Air concentrations for each time interval were calculated by the reviewer.
6. Procedural recoveries were not reported.

IV. References

1. U.S. Environmental Protection Agency. 2008. Fate, Transport and Transformation Test Guidelines, OCSPP 835.1410, Laboratory Volatility. Office of Chemical Safety and Pollution Prevention, Washington, DC. EPA 712-C-08-011.
2. U.S. Environmental Protection Agency (USEPA). 1989. FIFRA Accelerated Reregistration, Phase 3 Technical Guidance. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 540/09-90-078.

DER ATTACHMENT 1. Dithiopyr and Its Environmental Transformation Products. ^A

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	MRID	Maximum %AR (day)	Final %AR (study length)
PARENT						
Dithiopyr	IUPAC: S,S'-dimethyl 2-difluoromethyl-4-isobutyl-6-trifluoromethylpyridine-3,5-dicarbothioate CAS: S,S'-dimethyl 2-(difluoromethyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-3,5-pyridinedicarbothioate CAS No.: 97886-45-8 Formula: C ₁₅ H ₁₆ F ₅ NO ₂ S ₂ MW: 221.04 g/mol SMILES: <chem>n1c(C(F)F)c(C(=O)SC)c(CC(C)C)c(C(=O)SC)c1C(F)(F)F</chem>		835.1410 Laboratory volatility	49760101	NA	NA
MAJOR (>10%) TRANSFORMATION PRODUCTS						
No major transformation products were identified.						
MINOR (<10%) TRANSFORMATION PRODUCTS						
No minor transformation products were identified.						
REFERENCE COMPOUNDS NOT IDENTIFIED						
All compounds used as reference compounds were identified.						

^A AR means “applied radioactivity”. MW means “molecular weight”. NA means “not applicable”.

DER ATTACHMENT 2. Dithiopyr volatilization from soil

Chemical Name Dithiopyr
 PC Code 128994
 MRID 49760101
 Guideline No. 835.1410

Table 5. Volatilization of [¹⁴C]Dithiopyr, expressed as a percentage of the applied, from soil.											
Sampling Interval (days)	1	2	3	4	7	9	11	15	17	21	Sum
PUF Trap 1	27.66	12.70	5.96	4.91	6.97	2.82	2.19	3.16	1.13	2.43	69.93
PUF Trap 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01	0.01
Chamber - Top half	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.59	3.59
Sum (evaporated)	27.66	12.7	5.96	4.91	6.97	2.82	2.19	3.16	1.13	6.03	73.53
Cumulative evaporated	27.66	40.36	46.32	51.23	58.20	61.02	63.21	66.37	67.50	73.53	--
Soil (extract) 1st and 2nd										14.8	14.80
Soil (extract) 3rd										0.26	0.26
Soil (extract) 4th										0.2	0.20
Extracted residues										15.26	15.26
Unextracted residues										0.24	0.24
Chamber - Bottom half										2.46	2.46
Sum (non-volatilized)										33.22	17.96
Mass balance											91.49

Data obtained from Table 4, p. 28, of the study report; however, the sums were reviewer-calculated. NA = Not analyzed.

Table 6. Average Dithiopyr air concentrations throughout the experiment (reviewer-calculated).

Sampling Interval (days)	1	2	3	4	7	9	11	15	17	21	Entire period
Volatilized at each interval (% of applied)	27.66	12.7	5.96	4.91	6.97	2.82	2.19	3.16	1.13	2.44	73.53
Volatilized at each interval (μg) ¹	76.065	34.925	16.39	13.5025	19.1675	7.755	6.0225	8.69	3.1075	6.71	202.2075
Cumulative volume of air (L)	3691.5	7378.9	10587.2	14851.6	25908.5	33343.8	40681.4	55526.3	62975.5	77349.5	77349.5
Volume of air per interval (L)	3691.5	3687.4	3208.3	4264.4	11056.9	7435.3	7337.6	14844.9	7449.2	14374	77349.5
Air concentration ($\mu\text{g}/\text{m}^3$)	20.61	9.47	5.11	3.17	1.73	1.04	0.82	0.59	0.42	0.47	2.61

Data obtained from Tables 4-5, pp. 44-45, in the study report.

1 275 μg of dithiopyr were applied to the soil